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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1999		
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide BA2 Applied Research					R-1 ITEM NOMENCLATURE Next Generation Internet PE 0602110E, R-1 #7					
COST (In Millions)	FY1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost To Complete	Total Cost
Total Program Element (PE) Cost	39.313	49.504	40.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Next Generation Internet NGI-01	39.313	49.504	40.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) **Mission Description:**

(U) The Next Generation Internet (NGI) initiative has three goals: (1) promote experimentation with the next generation of networking technologies; (2) connect universities and national laboratories with high speed networks that are 100 - 1000 times faster than today's Internet; and (3) demonstrate revolutionary applications that meet important national goals and missions. The principal agencies involved in this initiative are DARPA, NSF, NIST, NIH and NASA. These agencies will share in funding this research and development effort. The DARPA activity will be aimed at part of the first two goals. DARPA will demonstrate end-to-end network connectivity at 1+ gigabits-per-second for 10 or more NGI sites. The network technologies to be addressed include multi-gigabit broadband networks, guaranteed quality of service mechanisms, and integrated network management. These technologies will be demonstrated in an NGI developed testbed environment.

(U) **Program Accomplishments and Plans:**(U) **FY 1998 Accomplishments:**

- Designed and initiated implementation of the NGI testbed. (\$ 7.313 Million)
- Created ultra high bandwidth Wavelength Division Multiplexed (WDM) connections for Next Generation Internet (NGI) testbed (Supernet). (\$ 15.000 Million)
- Developed NGI quality of service architecture and implemented initial operating system services. (\$ 15.000 Million)
- Executed Congressionally mandated add to the NGI program. (\$ 2.000 Million)

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**(U)     FY 1999 Plans:**

- Implement 10 gigabit-per-second, multi-wave optically switched Wavelength Division Multiplexed (WDM) technology in NGI testbed. (\$ 5.100 Million)
- Implement an alpha-level prototype high-speed optical multiplexor and develop specification of Internet Protocol (IP)/WDM protocol structure. (\$ 11.300 Million)
- Expand testbed to DoD supported laboratories and to 10 gigabit-per-second links. (\$ 5.304 Million)
- Implement prototype components of network monitoring and management system. (\$ 7.900 Million)
- Define application program interfaces for information management and collaborative applications. (\$ 4.900 Million)
- Execute Congressionally mandated partnerships between centers with supercomputers purchased with DoD RDT&E funds and DoD Major Shared Resource Centers. (\$ 5.000 Million)
- Execute Congressionally mandated regional partnerships for revolutionary applications. (\$ 10.000 Million)

**(U)     FY 2000 Plans:**

- Implement variable rate access technologies and prototype of distributed optical switching capability compatible with 100 Gb/s optical network. (\$ 6.000 Million)
- Implement streamlined Internet over WDM protocol structure, eliminating two layers of existing telecommunications infrastructure. (\$ 11.000 Million)
- Develop network planning and simulation technology to meet requirements for NGI scale networks. (\$ 5.500 Million)

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- Demonstrate real-time (500-msec response) monitoring and control of network resources at all levels. (\$ 3.500 Million)
- Complete interconnection of Supernet testbed components and software with 2.5 gigabit-per-second access architecture, up to 10 gigabit-per-second backbone, and 100 Gb/s distributed switching capacity. (\$ 9.000 Million)
- Demonstrate information management and collaborative applications operating over NGI testbed. (\$ 5.000 Million)

**(U) FY 2001 Plans:**

- Not Applicable.

<b>(U) <u>Program Change Summary:</u></b> <i>(In Millions)</i>	<b><u>FY 1998</u></b>	<b><u>FY 1999</u></b>	<b><u>FY 2000</u></b>	<b><u>FY 2001</u></b>
Previous President's Budget	40.453	40.000	40.000	0.000
Current Budget	39.313	49.504	40.000	0.000

**(U) Change Summary Explanation:**

FY 1998      Decrease results from minor program repricing and SBIR reprogramming.  
FY 1999      Increase due to Congressionally mandated partnership programs, less undistributed reductions mandated by the Appropriations Act and applied on a pro rata basis.

**(U) Other Program Funding Summary Cost:**

- Not Applicable.

**(U) Schedule Profile:**

- Not Applicable.

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